

CLAIMS

WHAT IS CLAIMED:

1. A method of calibrating a wireless tracking system, comprising:
providing at least one calibration signal using a mobile unit having a first plurality of
5 antennae while the mobile unit is proximate at least one predetermined location;
receiving a plurality of signals at a second plurality of antennae in response to
providing the at least one calibration signal;
determining a portion of a transmission matrix using the plurality of received signals
and the at least one calibration signal; and
10 associating the portion of the transmission matrix with the predetermined location.
2. The method of claim 1, wherein receiving the plurality of signals comprises receiving
a plurality of signals that traveled along different paths from the first plurality of antennae to
the second plurality of antennae.
- 15 3. The method of claim 1, wherein providing the at least one calibration signal
comprises providing at least one pilot signal.
4. The method of claim 3, wherein determining the portion of the transmission matrix
20 comprises determining the elements of the transmission matrix.
5. The method of claim 4, wherein determining the elements of the transmission matrix
comprises determining the elements of the transmission matrix using the at least one training
sequence.

6. The method of claim 5, wherein determining the portion of the transmission matrix comprises determining at least one of a singular value, an eigenvalue, and an eigenvector of the transmission matrix.

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7. The method of claim 1, wherein providing the at least one calibration signal while the mobile unit is proximate the at least one predetermined location comprises providing a plurality of calibration signals while the mobile unit is proximate each of a corresponding plurality of predetermined locations.

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8. The method of claim 1, further comprising storing the determined portion of the transmission matrix and the associated predetermined locations.

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9. The method of claim 1, wherein storing the determined portion of the transmission matrix and the associated predetermined location comprises storing the determined portion of the transmission matrix and the associated predetermined location in a database.

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10. A method of tracking a mobile unit in a wireless local area network, comprising:
receiving a plurality of signals at a first plurality of antennae;
determining a portion of a transmission matrix using the plurality of received signals;
and
associating the portion of the transmission matrix with a predetermined location.

11. The method of claim 10, wherein determining the portion of the transmission matrix comprises determining a plurality of elements of the transmission matrix.

12. The method of claim 11, wherein determining a portion of the transmission matrix comprises determining at least one of a singular value, an eigenvalue, and an eigenvector of the transmission matrix using the plurality of elements of the transmission matrix.

13. The method of claim 10, wherein associating the portion of the transmission matrix with the predetermined location comprises associating the portion of the transmission matrix with the predetermined location using a portion of at least one stored transmission matrix, and wherein the portion of the at least one stored transmission matrix is associated with the predetermined location.

14. The method of claim 13, wherein associating the portion of the transmission matrix with the predetermined location using the portion of the at least one stored transmission matrix comprises determining a nearest neighbor to the portion of the transmission matrix using a portion of the at least one stored transmission matrix.

15. The method of claim 10, wherein receiving the plurality of signals comprises receiving a plurality of signals provided by a second plurality of antennae.

16. The method of claim 15, wherein receiving the plurality of signals comprises receiving a plurality of signals that traveled along different paths from the second plurality of antennae to the first plurality of antennae.

17. The method of claim 15, wherein receiving the plurality of signals provided by the second plurality of antennae comprises receiving the plurality of signals at the first plurality of antenna coupled to an access point and provided by the second plurality of antennae coupled to a mobile unit.

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18. The method of claim 17, wherein determining the portion of the transmission matrix comprises determining a portion of the transmission matrix at the access point.

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19. The method of claim 15, wherein receiving the plurality of signals provided by the second plurality of antennae comprises receiving the plurality of signals at the first plurality of antennae coupled to at least one mobile unit and provided by the second plurality of antennae coupled to an access point.

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20. The method of claim 19, wherein determining a portion of the transmission matrix comprises determining the portion of the transmission matrix at the mobile unit.

21. The method of claim 20, further comprising providing the determined portion of the transmission matrix to the access point.

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22. The method of claim 10, wherein receiving the plurality of signals comprises receiving at least one pilot signal.

23. The method of claim 10, wherein receiving the plurality of signals at the first plurality of antennae comprises receiving a plurality of signals having a substantially common frequency at the first plurality of antennae.

24. The method of claim 10, further comprising estimating a location of the mobile unit in response to associating the portion of the transmission matrix with the predetermined location.

25. The method of claim 24, further comprising providing location-dependent information to the mobile unit using the estimated location of the mobile unit.

26. A wireless local area network, comprising:

A mobile unit having a first plurality of antennae capable of providing a plurality of signals;

an access point having a second plurality of antennae capable of receiving a plurality of signals in response to the plurality of signals provided by the mobile unit, the access point being capable of:

determining a portion of a transmission matrix using the plurality of received signals; and

associating the portion of the transmission matrix with a predetermined location.

27. The network of claim 26, wherein the access point is further capable of associating the portion of the transmission matrix with the predetermined location using a portion of at

least one stored transmission matrix, and wherein the portion of the at least one stored transmission matrix is associated with the predetermined location.

28. The network of claim 26, wherein the access point is further capable of estimating a location of the mobile unit in response to associating the portion of the transmission matrix with the predetermined location.

29. The network of claim 28, wherein the access point is further capable of providing location-dependent information to the mobile unit using the estimated location of the mobile unit.